REMARKS

The Applicants wish to thank the Examiner for reviewing the present application.

Amendments to the Specification

The abstract has been amended replacing "see" with "seed" as suggested by the Examiner.

Reference numeral "272" on page 15 has been corrected as suggested by the Examiner.

No new subject matter is believed to have been added by way of these amendments.

Amendments to the Claims

Claim 1 has been amended to clarify the way in which the value of connectivity is assigned by incorporating the limitations of claim 2. Since the amendment of claim 1 incorporates a feature originally recited in the claims, the Applicants respectfully submits that such amendment does not necessitate a further search by the Examiner. Claim 2 has been cancelled accordingly.

Claims 3 to 4 and 7 to 9 have been amended to correct dependencies per the cancellation of claim 2 and the objections raised by the Examiner (see below).

Claim 23 has been amended to be consistent with the amendments made to claim 1.

Claim 25 has been amended to reorder the steps to improve clarity and readability. The preamble of claim 25 has also been amended to indicate that the method is directed to the selection of an initial location. Support for these amendments can be found on page 5, line 24 through page 6, line 10.

Claim 26 has been amended for clarity.

Claim 28 has been amended to include the limitations of previous claim 29 but to specify that adjustment is only needed if the first and second numbers do not correlate. The preamble of claim 28 has also been amended to indicate that the method is directed to the establishment of a threshold value. Support for these amendments can be found on page 15, line 19 through page 16, line 15.

Claim 29 has been amended to specify that adjustment is performed until the first and second numbers substantially correspond to each other.

Claims 30, 31 and 32 are new and are directed to computer readable media having instructions for performing the methods recited in claims 1, 25 and 28 respectively.

No new subject matter is believed to have been added by way of these amendments.

Claim Rejections – 37 CFR 1.75(a)

Claims 9, 14 and 25 have been objected to under 37 CFR 1.75(a) for failing to particularly point out and distinctly claim the subject matter.

Regarding claims 9 and 14, the dependencies have been corrected as outlined above thereby overcoming the objections thereto.

Regarding claim 25, the preamble has been amended to include "an initial location" thereby overcoming the objection thereto.

It is believed that claims 9, 14 and 25 thus amended comply with 37 CFR 1.75(a).

Claim Rejections – 35 U.S.C. 103

Claims 1-3, 6-7, 20-23 and 25-27 have been rejected under 35 U.S.C. 103(a) as being unpatentable over George III (US 6,175,655) in view of Udupa (US 5,812,691). The Applicants respectfully traverse the rejections as follows.

As noted above, claim 1 has been amended to include the limitations of claim 2 and claim 2 has been cancelled. As such, the Applicants will address the Examiner's remarks in rejecting claim 2.

As discussed in the present application as filed at page 7, lines 1-13, determination of the value of connectivity of, e.g. a voxel comprises examining a predetermined characteristic along a path from the seed point to, e.g. the voxel and for the voxels along the path. By looking at data points along the path, points that are not on the structure can be avoided. In this way, not only distance but also direction are used to determine which points are to be examined.

In George III, although the fuzzy generalization looks at specific distances between points, George III does not discuss establishing a path between points and monitoring along the path as recited in claim 1 as amended. George III only mentions looking at distance between the points, which would not have the same effect as what is recited in claim 1 since a point that is very close to the seed point and even very close to the structure may still be outside of the structure according to the structure's path within the image or data set, e.g. an artery. The Applicants believe that the Examiner has overlooked the incorporation of a path as previously recited in claim 2.

Regarding Udupa at column 8, lines 15 to 60 also cited by the Examiner, the Applicants believe the Examiner has again overlooked the recitation of a path in claim 2 (and now claim 1

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as amended). In fact, Udupa appears to be discussing fuzzy subsets in column 8 and does not mention let alone describe monitoring a characteristic along a path while also considering distance as recited in claim 1 as amended. As such, Udupa fails to teach what is missing from George III.

It is therefore respectfully submitted that neither George III nor Udupa, alone or in combination teach what is recited in claim 1 and thus claim 1 is believed to be patentable over such references for at least that reason.

Claims 3, 6-7 and 20-22 being ultimately dependent on claim 1 are also believed to be patentably distinguished over George III and Udupa for at least that reason. As discussed above, claim 23 has been amended to be consistent with amended claim 1 and thus similar arguments apply to claim 23.

Regarding claim 25, as noted above, claim 25 has been amended to specify that the method is directed to selecting an initial location and to reorder the steps for clarity. As discussed on page 5, line 24 through page 6, line 10 of the application as filed, the initial point to begin the segmentation process can be determined semi-automatically or automatically by looking at characteristics of the feature of interest (structure to be segmented), e.g. by looking at the material type. By looking at and identifying such characteristics, the initial point can then be selected. The passage in George III identified by the Examiner on page 8 of the office action merely states the desired result, i.e. selection of a seed point to identify a structure. There is no discussion of how the seed point is selected, let alone by looking at characteristics of the structure. It is believed that claim 25 as amended clarifies this distinction and thus claim 25 is also believed to be distinguished over George III and Udupa. Claims 26-27 being dependent on claim 25 are also believed to be patentably distinguished for at least that reason.

Claims 4 and 5 have been rejected under 35 U.S.C. 103(a) as being unpatentable over George III and Udupa in further view of Zhang (US 2003/0144598). The Applicants respectfully traverse the rejections as follows.

Claims 4 and 5 are dependent on claim 1 which is believed to be patentable over George III and Udupa as discussed above. Therefore, Zhang must not only teach what is recited in claims 4 and 5 but also what is believed to be missing from George III and Udupa. Although Zhang teaches using a weighting factor, Zhang does not monitor variations in a predetermined parameter along a path between the data point to generate a value of connectivity. For at least this reason, claims 4 and 5 are believed to be patentable over George III and Udupa in further view of Zhang.

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Claims 8-9 and 24 have been rejected under 35 U.S.C. 103(a) as being unpatentable over George III and Udupa in further view of Dellepiane (IEEE, Vol. 5, No. 3 March 1996, pp. 429-446). The Applicants respectfully traverse the rejections as follows.

Claims 8-9 and 24 are dependent on claim 1 which is believed to be patentable over George III and Udupa as discussed above. Therefore, Dellepiane must not only teach what is recited in claims 8-9 and 24 but also what is believed to be missing from George III and Udupa. Although Dellepiane teaches using a topological map from which one can derive a set of object areas or contours, Dellepiane does not monitor variations in a predetermined parameter along a path between the data point to generate a value of connectivity. For at least this reason, claims 8-9 and 24 are believed to be patentable over George III and Udupa in further view of Dellepiane.

Claims 10-19 and 28-29 have been rejected under 35 U.S.C. 103(a) as being unpatentable over George III and Udupa in further view of Turek (US 6,754,376). The Applicants respectfully traverse the rejections as follows.

Regarding claims 10-19, claims 10-19 are dependent on claim 1 which is believed to be patentable over George III and Udupa as discussed above. Therefore, Turek must not only teach what is recited in claims 10-19 but also what is believed to be missing from George III and Udupa. Although Turek teaches using various classification factors in segmenting an image, Turek does not monitor variations in a predetermined parameter along a path between the data point to generate a value of connectivity. For at least this reason, claims 10-19 are believed to be patentable over George III and Udupa in further view of Turek.

Regarding claim 28, as noted above, claim 28 has been amended to indicate that the method is directed to establishing a threshold value for a segmentation process and to specify that adjustment of the threshold is performed if the first and second numbers do not correlate. As discussed on page 15, line 19 through page 16, line 15 of the application as filed, an expected data set, e.g. an expected volume can be used to determine a threshold by setting the threshold, determining how many data points meet the threshold to generate a second data set and comparing the data sets. In this way, the threshold can be adjusted until it produces an expected data set, e.g. one having an expected volume.

In the passage from Turek cited by the Examiner, Turek discusses comparing classification values in 2D and 3D. This is not the same as setting a threshold and a determining an expected data set then generating a second data set using the threshold and comparing the data sets to permit adjustment of the threshold. There is simply no discussion of

a threshold in Turek. Although Udupa mentions a threshold, there is again no discussion of adjusting the threshold in the way described in claim 28. For at least these reasons, claim 28 is believed to be patentably distinguished over George III and Udupa in further view of Turek. Claim 29 being dependent on claim 28 is also believed to be patentably distinguished for at least that reason.

Summary

In view of the foregoing it is believed that all pending claims, namely claims 1 and 3 to 32 are patentably distinguished over the references cited by the Examiner and thus are in condition for allowance.

As such, the Applicants request early reconsideration and allowance of the present application.

Respectfully submitted,

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